

I/WE CLAIM:

1. A method for controlling phase delay (chromatic dispersion & polarization mode dispersion) of light within an optical waveguide comprising a core substantially axi-symmetrically surrounded by a cladding having a substantially fixed index of refraction, the method comprising a step of:

controlling optical characteristics of grating within the core by varying a refractive index of a variable-index material surrounding the cladding at least in the vicinity of the grating at an optical waveguide region having a radial thickness of the cladding less than a penetration depth of an evanescent field of light propagating in the waveguide core.

2. An optical device for controlling propagation of light within an optical waveguide comprising a core substantially axi-symmetrically surrounded by a cladding having a substantially fixed index of refraction, the optical device comprising:

a control region of the optical waveguide in which a radial thickness of the cladding is less than a penetration depth of an evanescent field of light propagating in the waveguide core;

a grating within the core of the control region;

a variable-index material surrounding the cladding at least in the vicinity of the grating, the variable-index material having an index of

- 22 -

refraction that is controllable in response to an applied stimulus; and

a controller adapted to controllably apply the stimulus to the variable-index material at least in the vicinity of the grating.

3. An optical device for controlling propagation of light within an optical waveguide comprising a core substantially axi-symmetrical surrounded by a cladding having a substantially fixed index of refraction, the optical device comprising:

a grating within the core of the waveguide;

a gap within the waveguide, at least a portion of the grating being disposed on either side of the gap;

a control region proximal the gap;

a variable refractive index material, which fills the gap;

a controller adapted to controllably apply the stimulus to the variable-index material in the gap.